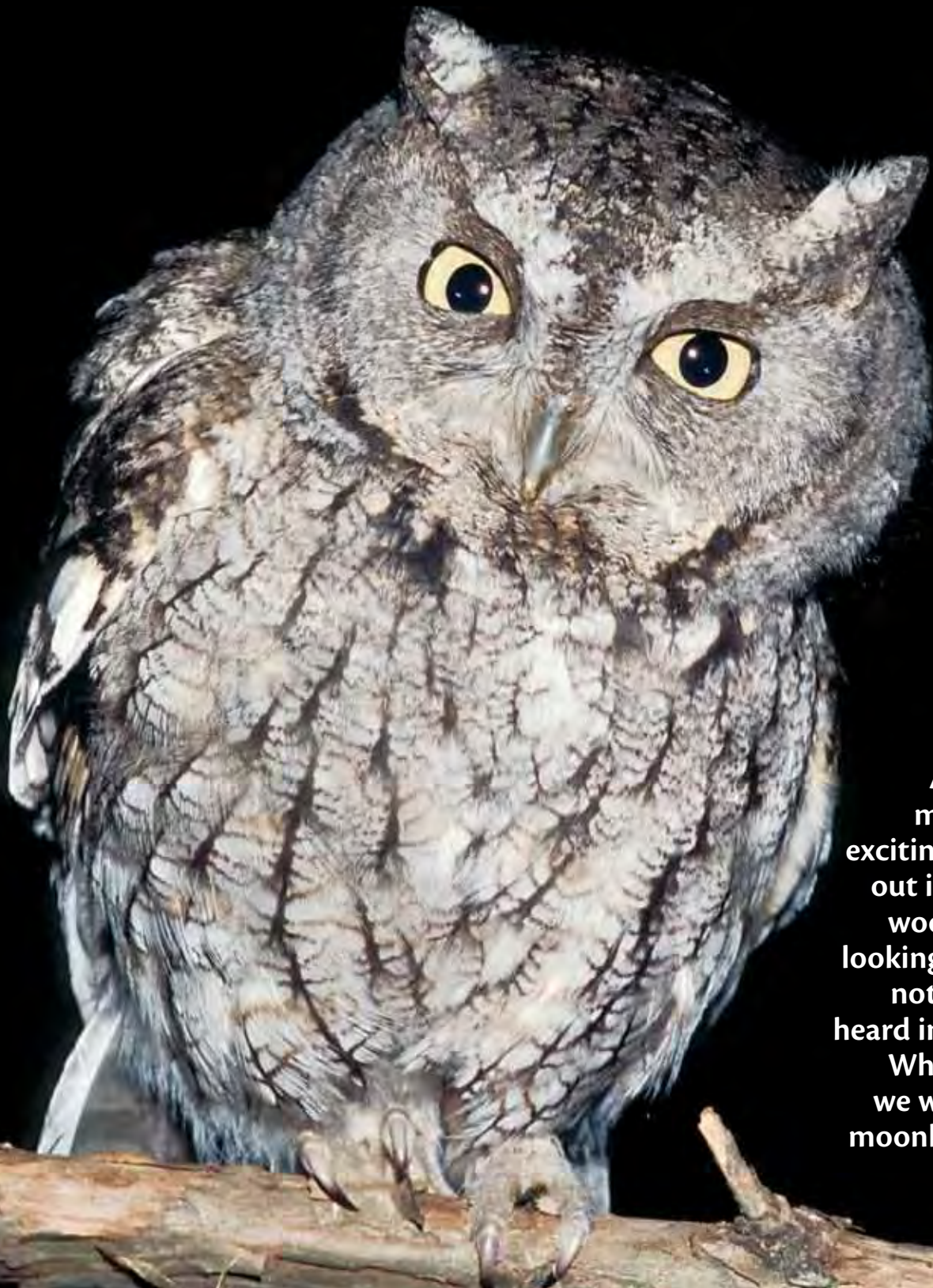


Nature's **NIGHT SHIFT**

EXPLORING OUTDOOR MISSOURI AFTER DARK

by Barb Bassett



A night hike is mysterious and exciting. We venture out into Missouri's woods and fields, looking for creatures not often seen or heard in the daytime. Who knows what we will find on the moonlit trail ahead?

A SENSE OF THE DARK

Exploring outdoors at night isn't really natural for humans. We are diurnal animals, part of nature's "day shift" (which also includes most birds, and some small mammals such as squirrels). Our senses are adapted for life in bright light. Darkness makes us nervous: "Where am I? What's that strange sound? Could something be lurking out there?"

In contrast, nature's "night shift" is quite at home after the sun goes down. Animals that are nocturnal (night-active) and crepuscular (active at dawn and dusk) have sensory abilities that allow them to travel, feed and find mates in very low light.

SIGHT AT NIGHT

The eyes of nocturnal birds and animals make good use of what little light is available. Three special adaptations make this possible.

First, nocturnal creatures often have very large eyes, which gather more light. Compare an owl's huge eyes with the smaller eyes of a hawk, which may hunt the same fields as the owl during the day.

A second feature of the eyes of nocturnal animals is the presence of fewer "cones" and more "rods," two structures on the retina of the eye. Cones pick up colors and sharp details; they require bright light to function. Rods are more useful at night, because they work in dim light to detect shapes, movement and shades of grey.

Third, many nocturnal animals have a mirrorlike reflective layer behind the retina of the eye, called the tapetum. This layer reflects light back to the retina, and then out of the eye. This means that the retina is struck twice, once by incoming and once by outgoing light, so that objects seen at night look brighter. The tapetum is also the reason for eyeshine (see "The Story Behind Eyeshine" on this poster).

SOUND AT NIGHT

In the dark, sharp ears can make the difference between life and death. Nocturnal prey animals such as mice, rabbits and deer have acute hearing and large external ears to detect the approach of a predator. Still, they don't always escape—because nighttime predators also have exceptional hearing.

Two predators symbolic of the night—owls and bats—have

specially adapted "hearing systems" for catching their prey.

An owl's entire face is designed to catch sound, like a satellite dish. Its huge, curved ear openings are hidden beneath the feathers on either side of its head. With this sophisticated hearing equipment, an owl can locate and catch a mouse in total darkness.

A bat has small, weak eyes, but phenomenal hearing. While flying, it sends out a constant stream of ultrasonic squeaks, which bounce back as echoes when they strike objects—even tiny ones such as gnats and mosquitoes. A bat's "echolocation" is so accurate that it can catch and eat one insect every few seconds, adding up to half its body weight each night.

Human ears may not be nearly as good as an owl's or a bat's, but you still can use yours to detect many members of nature's night shift. (See the "Calendar of Missouri's Night Sights and Sounds" on this poster.)

SMELL AND TOUCH AT NIGHT

When an animal can't rely on its eyes, all other senses increase in importance, including smell and touch.

Most mammals can smell far better than humans. The night air gives them information that we can't even imagine about nearby food, possible mates and lurking predators (or wildlife watchers).

Night creatures also use touch to gather information about their surroundings. Pressure on sensitive whiskers, or the way the wind blows against fur or feathers, help nocturnal mammals and birds navigate in the dark. Detecting vibrations or body heat allows some snakes and spiders to locate their prey. Clearly, eyes aren't the only way to "see" at night!

NIGHT TIME—THE RIGHT TIME?

Night life does have certain benefits. It provides an escape from summer heat, and it allows prey animals to move about, feed and find mates under cover of darkness. Also, by filling in the night shift, some animals take on the roles filled by other animals during the day; this "partnership" reduces competition for food and territory. Three such day/night partners are hawks/owls, squirrels/flying squirrels and butterflies/moths.

Still, living in the dark seems difficult, at least to diurnal creatures like us. The fact that there are so many night-active animals shows how nature tends to fill every ecological niche, no matter how challenging.

BIOLUMINESCENCE: LIVING LIGHTS

There is nothing more magical in nature than bioluminescence—light that comes from living things. All bioluminescence is caused by the same chemical reaction: the protein luciferin reacts with the enzyme luciferase, a molecule called ATP, and oxygen. When this reaction occurs in the tissues of an animal or plant, it creates the "cold fire" of bioluminescence.

In Missouri, we can witness this amazing sight on summer evenings, when our backyards glitter with fireflies. Harder to spot, but not uncommon in Missouri's outdoors, are glow-worms—the larvae of fireflies—and foxfire, the mysterious light created by luminescent, wood-decaying fungi.

Bioluminescence of a Jack-o'-Lantern mushroom.



Fireflies flash their “taillights” when looking for mates. You can tell the sex of a firefly from its location while flashing: males flash mostly in the air, while females flash while sitting on or near the ground.

Before they turn into fireflies, glowworms spend all their time on the ground. They can sometimes be seen in large numbers at night, giving off a pale light at the edges of roads or along shorelines.

Look for the eerie, blue-green glow of foxfire on rotten logs or in forest leaf litter. Most foxfire is produced by the mycelium (“roots”) of the Honey Mushroom. Another luminescent mushroom is the Jack-o’-Lantern, which has gills that glow in the dark. Both of these mushrooms grow in large clusters around the bases of trees.

To see foxfire and other glowing fungi in Missouri woodlands, your eyes must be fully dark-adjusted (this takes 20-30 minutes). Look during rainy days in late summer or fall.

THE STORY BEHIND EYESHINE

What’s that racket? Shine a flashlight outside your tent, and you might see the glowing eyes of a raccoon visitor!

Actually, the raccoon’s eyes aren’t glowing, but reflecting the light from your flashlight back to you. This phenomenon is called eyeshine, and is characteristic of many nocturnal animals. In mammals, eyeshine is caused by a mirrorlike surface behind the retina, called the tapetum.

Eyeshine color can sometimes help identify an animal at night. For example, if your flashlight reveals two tiny red eyes high in a tree, you have spotted a flying squirrel!

As you drive at night, look along the road for the eyeshine of deer (yellow), opossums (orange), and whippoorwills (red).

TIPS FOR WILDLIFE WATCHING AT NIGHT

Be safe Scout your observation area in the daytime. Don’t hike alone at night, and tell someone where you are going and when you will be back.

Be equipped Bring a flashlight with fresh batteries. Try covering the lens of the flashlight with red plastic wrap, fastened with a rubber band. (Most night animals can’t see red light.) A tape recorder for night sounds, and binoculars to see wildlife at dusk, are also fun for wildlife-watching at night.

Be comfortable Wear sturdy, closed-toe shoes and warm, layered clothing. Insect repellent, a plastic garbage bag to sit on, a water bottle and some snacks will also make your hike more enjoyable.

Be quiet! And patient, and very, very still. It’s best to settle down quietly in one place for 20-30 minutes. (It takes that long for the rods in the human eye to adjust to darkness.)



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WHOOO'S OUT THERE?

INTRODUCING MISSOURI'S NIGHT SHIFT



RACCOON

Mammals

Though we occasionally may spot them in daylight, almost all of Missouri's larger wild mammals are nocturnal—including deer, raccoons, foxes, coyotes, opossums, skunks, beavers, bobcats and badgers.

So are we more likely to see wild mammals if we search for them at night? Not really—because they sense us first. Most nighttime mammal sightings are accidental—an opossum caught in the car headlights, or a raccoon peering out of a campground tree. Sometimes we may hear them from afar—the breathy snort of a startled deer, the slap of a beaver's tail, the yips, barks and howls of distant coyotes.

Surprisingly, the nocturnal mammals easiest to observe are bats. Look for them at dusk, in places where flying insects are plentiful: over bodies of water, above meadows and clearings, and near barns and street lights. Their flight as they chase insects is erratic and fluttering. In Missouri, our most often-seen bats are the Little Brown Bat and the Red Bat.

Small nocturnal prey mammals are rarely seen at night. Flying squirrels, however, can sometimes be detected by the tiny, but distinct, sounds they make.

The best place and time to hear flying squirrels is near a woodland stream, late at night. Listen for a high-pitched “tseet” repeated at 3- to 5-second intervals, or a musical chirping, or the soft thump of a small body landing against a tree.

WHOOO'S OUT THERE?

INTRODUCING MISSOURI'S NIGHT SHIFT

Snakes

On a hot July night, you might see a speckled kingsnake cross the trail in front of you, or watch a northern water snake curve its way across a moonlit pond. Summer nights are prime hunting time for snakes, whose diet includes small prey such as insects, mice and frogs.

Some people are bothered by the thought that copperheads and rattlesnakes are active at night. It helps to remember that these snakes are shy and non-aggressive. If you come across any snake at night—venomous or not—simply back away and watch it from a distance.



SPECKLED KINGSNAKE

WHOOO'S OUT THERE?

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Frogs, Toads and Salamanders

All Missouri toads and frogs must mate and lay their eggs in water. On spring nights, any fishless pond, flooded field or ditch may host a frog-and-toad concert.

Often-heard voices in this concert are those of the spring peeper, western chorus frog, cricket frog, bullfrog and American toad.

Spring peepers simply emit a piercing "peep!" about once per second. At night, it's possible to get quite close to spring peepers while they are singing. With a flashlight, look for them clinging to reeds at the edges of ponds.

The voice of a chorus frog sounds like someone running a thumbnail across the teeth of a pocket comb. A cricket frog makes a clicking sound, "gick-gick," like two pebbles struck together twice. The bullfrog's baritone call is a deep, bellowing "ger-rrr-um."

The American toad is one of Missouri's most familiar animals, found in lawns and gardens, as well as wild places. But most people would not recognize this toad's call—a high-pitched trill lasting 6 to 30 seconds.

Though they spend most of their lives hidden under logs and leaf litter, some salamander species migrate in spring or fall. You may see a group of spotted or ringed salamanders crossing a rain-slick road at night, heading for a woodland breeding pond.



**AMERICAN
TOAD**

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MISSOURI EVENING PRIMROSE

Plants

Why hunt for plants at night? To enjoy the scent of night-blooming flowers and the amazing sight of glowing fungi (see “Bioluminescence: Living Lights,” on this poster).

Missouri evening primrose has large, lemon-yellow flowers that open at sunset and close by mid-morning the next day. It grows in dry, rocky places, such as limestone hillsides, roadcuts and Ozark glades (hence its other name: glade lily). Like many night-blooming flowers, evening primrose is sweet-smelling; its winelike scent attracts pollinating moths.

If you visit a patch of evening primroses at dusk, you may glimpse what looks like a hummingbird flitting from flower to flower. Look again! What you are seeing is a hawkmoth, a night-pollinating moth that has the appearance and movements of a day-pollinating hummingbird.

WHOOO'S OUT THERE?

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Insects and Spiders

The most familiar of all night sounds is the buzzing, trilling background noise made by hordes of night-calling insects. Much of this noise is made by the breeding males of just two groups of insects: crickets and katydids. (Other well-known insect singers, the grasshoppers and cicadas, are usually quiet at night.)

As a rule, crickets produce musical, evenly spaced chirps, while katydids make a raspy *ch-ch*, or *ch-ch-ch* sound (to the rhythm of ka-ty or kay-ty-did). Groups of katydids sometimes call in unison, so the sound seems to pulsate through the night air.

Most spiders are nocturnal hunters, whether they hunt on the ground, like wolf spiders, or spin a web to snare prey.

To find spiders in the dark, try shining a flashlight into grass or other low vegetation. You may see the glitter of little spider eyes. Wolf spiders, fishing spiders and crab spiders all have eyeshine. Web-building spiders don't, but their webs glow white in a flashlight beam.

As anyone with a porch light knows, the night is full of moths. Two of the largest and most colorful moths in Missouri are the pale-green, long-tailed luna moth, and the reddish-brown Polyphemus, with its dramatic eyelike wingspots.

Moths also can be spotted with a flashlight, because many moths have eyeshine.



LUNA MOTH

WHOOO'S OUT THERE?

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Birds

Owls, of course, are the best-known night-calling birds. In Missouri, the owl voices most often heard are those of the barred, great horned and screech owls.

Barred owls make the distinctive hoot-series *hoo hoo hoo hoo, hoo hoo hoo hoo ahh* ("Who cooks for you? Who cooks for you-all?"). The call of the great horned owl is a low-pitched series of 4-6 hoots. Screech owls don't really hoot at all; their call is a descending whinny, or one long, quavering note.

The easiest way to hear owls is to drive out to the country around dusk, and stop at a place near both fields and woods. Roll down the car window and listen for calling owls.

Also listen and watch for these other night-active birds (listed from most- to least-often heard):

WHIPPOORWILL: It's easy to tell when a whippoorwill is nearby, since it announces its name over and over and over! Watch for the red eyeshine of whippoorwills on roads in wooded areas.

NIGHTHAWK: Nighthawks are easy to identify from their call—a harsh, nasal "peent"—and from their darting, swooping flight. Look for them around streetlights, and also above native prairies and Ozark glades.

CATBIRD AND MOCKINGBIRD: These two mimics of the bird world often call at night, imitating everything from a lost kitty to the calls of other birds.

WOODCOCK: During its mating display at dusk, the male woodcock makes three distinct sounds: first, on the ground, a "peenting" call; then a musical twittering, created by its wings as it spirals high into the air; and finally, an encore of twittering and chirping as the woodcock zig-zags back to the ground.

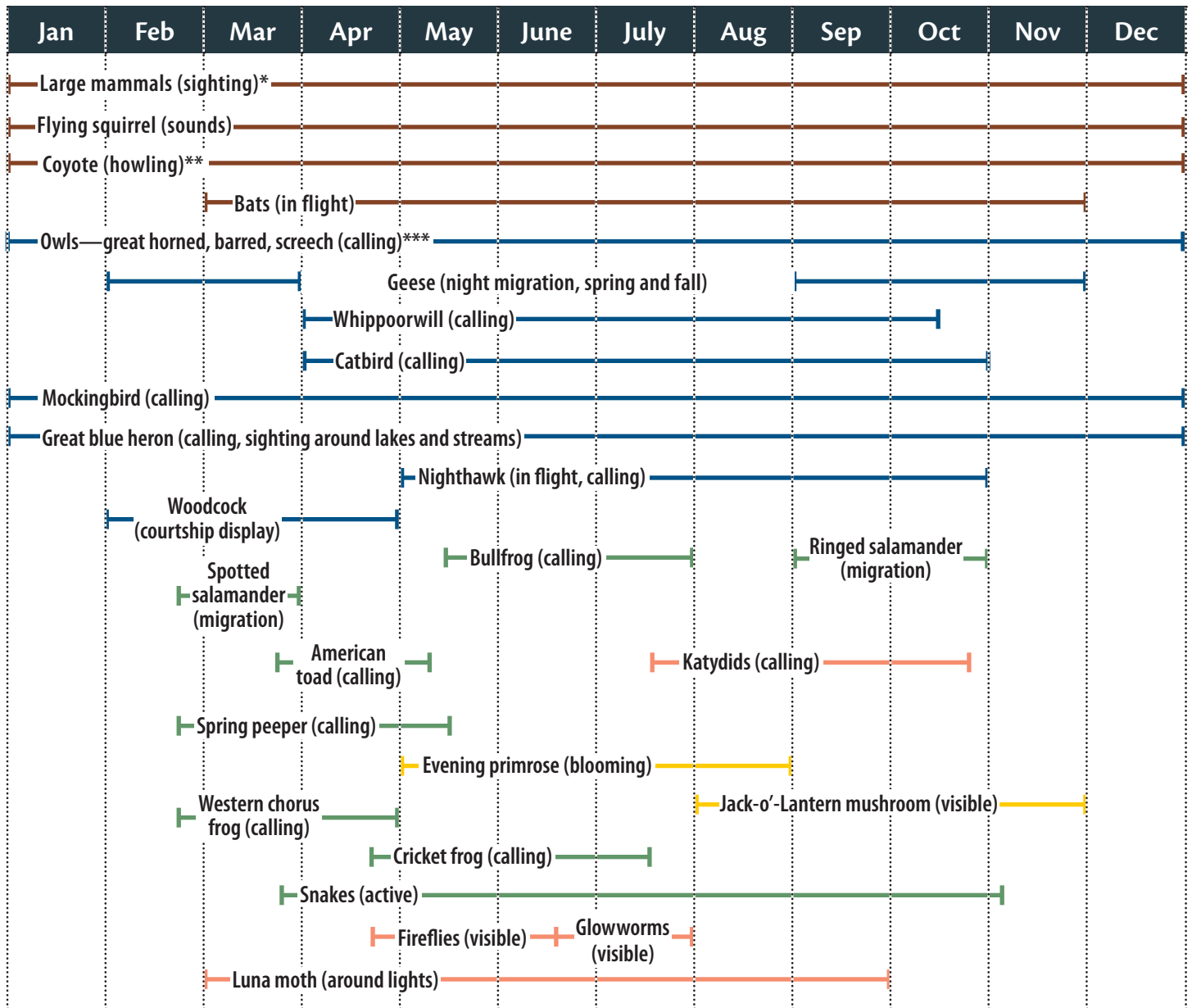
GREAT BLUE HERON: Look for this huge, storklike bird at dusk, around lakes, ponds, rivers and marshes. Its cry is a low, harsh "gwok."

Most bird species migrate at night, in spring and fall. On clear nights, watch (and listen) for flocks of geese and other birds as they pass across the face of the moon.



BARRED OWL

CALENDAR OF MISSOURI'S NIGHT SIGHTS AND SOUNDS



MAMMALS
 BIRDS
 PLANTS
 INSECTS
 AMPHIBIANS AND REPTILES

* Missouri's large nocturnal mammals—deer, raccoons, foxes, coyotes, opossums, skunks, beavers, bobcats and badgers—can be sighted year 'round, but may be less active during harsh winter weather.

** Howling peaks in February and March

*** Calling is less frequent November through January, more frequent February through March

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